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Is sitting the new smoking?

Ten-year change in sedentary behavior and cardiorespiratory fitness are independently associated with clustered cardio-metabolic risk

Sara Knaeps[1, 2], Jan G. Bourgois [2], Ruben Charlier[1], Evelien Mertens [1, 3], Johan Lefevre [1], Katrien Wijndaele [4]

[1] Physical Activity, Sports and Health Research Group, Department of Kinesiology, KU Leuven, Leuven, Belgium [2] Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium [3] Department of Human Biometrics and Biomechanics, Vrije Universiteit Brussel, Brussels, Belgium [4] MRC Epidemiology Unit, Institute of Metabolic Science, University of Cambridge School of Clinical Medicine, Cambridge, UK

Conclusion

- A combination of decreasing sedentary behavior (SB) and increasing cardiorespiratory fitness (CRF) is most beneficial towards cardio-metabolic health, not moderate and vigorous physical activity (MVPA)
- Associations between CRF and cardio-metabolic risk were mediated through changes in waist circumference
- From a public health perspective, lifestyle interventions need to focus on lowering SB & increasing CRF

Introduction

- A growing proportion of adults is **inactive**
- **Sedentary behavior** (SB) is highly prevalent, even in those who are sufficiently active
- **Cardiorespiratory fitness** (CRF) is a strong predictor for cardio-metabolic health
  - ➔ Accumulating evidence has suggested that these three exposures (SB, MVPA & CRF) contribute independently to unhealthier cardio-metabolic risk profiles.
- Central adiposity and nutritional intake negatively influences cardio-metabolic health
  - ➔ Important candidate to examine as potential mediator

Aim

- Examine the **independent associations** between **change** in sedentary behavior, MVPA and CRF and concurrent **change** in clustered cardio-metabolic risk over a ten-year follow up
  - ➔ Whether any independent associations were **mediated** by change in central adiposity or nutritional intake
  - ➔ Whether change in exposures interact with each other

Methods & Materials

2002-2004
n = 1569

9,62 (±0.52) years

2012-2014
n = 652
42%

- SB and MVPA were self-reported (FPACQ)
- CRF was determined by means of a maximal exercise test
- Cardio-metabolic Risk Score (CMRS): Standardized values (by sex and age) for waist circumference, fasting glucose, HDL-cholesterol, triglycerides, blood pressure were summed and divided by five
- $CMRS_{no\ adip}$: CMRS without waist circumference and divided by four
- Statistical analyses:
  - Multiple linear regression with standardized regression coefficients
  - Mediation analysis by the product of coefficients (a*b) method by MacKinnon
  - Interaction effects between change in exposures

Results

Multiple Linear Regression

Model = adjusted for age, follow-up time, sex, original study population, baseline and changes in healthy eating, smoking, education level; changes and baseline of all three exposures

Table 1. Standardized regression coefficients (β) of sedentary behavior, moderate-and-vigorous physical activity and cardiorespiratory fitness for cardio-metabolic markers

	Change in SB	Change in MVPA	Change in CRF
Change in	β	β	β
CMRS	0.12**	-0.08	-0.38***
$CMRS_{no\ adip}$	0.12**	-0.10	-0.31***
Waist Circumference	0.04	0.00	-0.39***
Fasting Glucose	0.01	0.00	-0.12*
HDL-cholesterol	-0.09	0.15**	0.22***
Triglycerides	0.12*	-0.04	-0.19***
Diastolic Blood Pressure	0.08	-0.08	-0.21***
Systolic Blood Pressure	0.05	-0.01	-0.12**

*p<0.05; **p<0.01;***p<0.001

Mediation Analysis

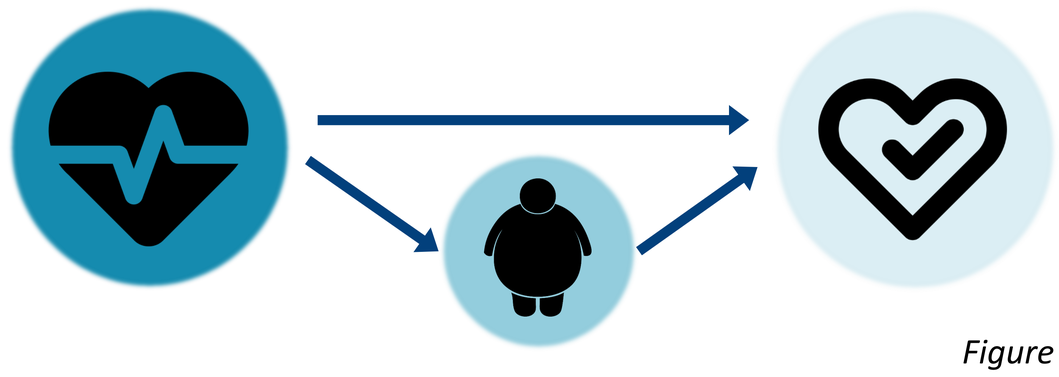

Figure 1.

Interaction Analysis

Figure 2. Estimated marginal means (SE) for change in CMRS in six groups of participants, defined by their change in CRF (decrease (62%) and no decrease (38%) over time) and change in sedentary behavior (decrease (37%), increase between 0-4 h/week (24%) and increase by > 4h/week (39%)

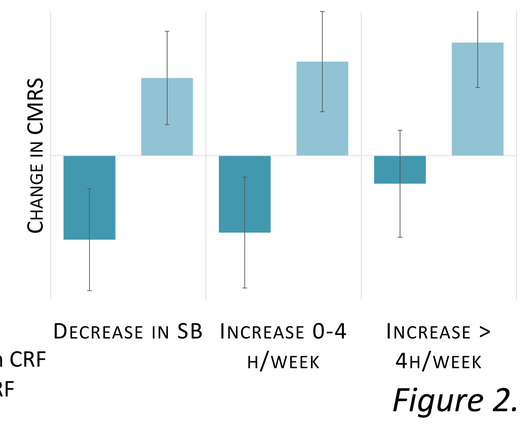

Figure 2.

References

- MacKinnon DP, Fairchild AJ, Fritz MS: Mediation analysis. Annual review of psychology 2007
- Wijndaele K, Orrow G, Ekelund U, Sharp SJ, Brage S, Griffin SJ, Simmons RK: Increasing objectively measured sedentary time increases clustered cardiometabolic risk: a 6 year analysis of the ProActive study. Diabetologia 2014